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WELSH & KATZ, LTD
120 S RIVERSIDE PLAZA
22ND FLOOR
CHICAGO, IL 60606

EXAMINER	
WANG, QUAN ZHEN	
ART UNIT	**PAPER NUMBER**
2633	

DATE MAILED: 07/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/075,067	WANG ET AL.	
	Examiner	Art Unit	
	Quan-Zhen Wang	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 April 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20,25-27 and 29-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20,25-27 and 29-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because the circle on left hand side and the triangle on the right hand side in fig. 1 are not labeled.

The vertical axis in fig. 5 is not properly labeled. It is not clear what "AMOUNT AWAY FROM TARGET" means.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-20, and 30 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 1 recites " ... emit signals at ..., different output parameter values ..." in line 7. But the instant application does not teach what it means by the "output parameter values". Therefore, the disclosure fails to enable a person skilled in the art to make and use the claimed invention as recited in claims 1-5.

Claim 6 recites "a plurality of channel based radiant energy beams" in line 6, "for a selected parameter" in line 7. But neither "channel based radiant energy beams" nor "a selected parameter" are described in the instant application. Therefore, the disclosure fails to enable a person skilled in the art to make and use the claimed invention as recited in claims 6-9.

Claim 10 recites "setting an output parameter" in line 5. But the instant application does not teach what it means by the "output parameter", consequently it does not teach how to set the "output parameter". Therefore, the disclosure fails to

enable a person skilled in the art to make and use the claimed invention as recited in claims 10-20.

Claim 30 recites "adjusting an output parameter profile" in lines 8-9. But the instant application does not teach what is the "output parameter profile" and how to adjust the "output parameter profile". Therefore, the disclosure fails to enable a person skilled in the art to make and use the claimed invention as recited in claims 30.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4, 6-10, 13, and 15-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Chraplyvy et al. (U.S. Patent US 5,225,922).

Regarding claims 1, 6, Chraplyvy teaches a communication network (fig. 2) comprising: a plurality of optical links (span 20); a plurality of amplifiers (amplifier 22), coupled to the links for amplification of optical signals transmitted through the links wherein the amplifiers have a common gain profile with respect to a predetermined range of wavelengths (column 3, lines 66-67 and column 4, lines 1-3); and a plurality of transmitters (combination of P1-Pn and optical power adjuster 54) of optical signals wherein the members of the plurality emit signals at predetermined, different output

parameter values wherein the values are selected in accordance with the gain profile (column 4, lines 16-56).

Regarding claims 2, 8 and 9, the network of Chraplyvy inherently includes transmitter drive circuits coupled to the transmitters, and Chraplyvy further teaches that the drive circuits (which drives the power adjuster portion of the transmitter) drive the transmitters at power levels selected in accordance with the gain profile (column 4, lines 16-56).

Regarding claims 3 and 4, Chraplyvy further teaches that the transmitter output parameter values (power) are selected in accordance with an inverse of the gain profile (column 4, lines 16-56).

Regarding claim 7, Chraplyvy further teaches that at least some of the energy beams are transmitted through up to a pre-determined number of links and wherein the pre-set profile comprises an inverse of the common gain profile raised to an exponent corresponding to the number of links (fig. 3).

Regarding claim 10, Chraplyvy teaches a compensation process for a network comprising: evaluating variations in amplifier gain over a selected range of wavelengths (column 4, lines 16-56); establishing an inverse function of the gain variations (1/Gi); and setting an output parameter of an optical transmitter in accordance with a corresponding value of the inverse function on a per wavelength basis (equation A).

Regarding claim 13, Chraplyvy further teaches to set an output parameter for each one of a plurality of optical transmitters in accordance with a corresponding value

of the inverse function selected from a plurality of corresponding wavelengths (equation A).

Regarding claim 15, Chraplyvy further teaches to provide a plurality of optical transmitters (fig. 2).

Regarding claim 16, the providing step in the process of Chraplyvy inherently comprises providing a plurality of lasers as optical transmitters.

Regarding claim 17, Chraplyvy further teaches to set a power output parameter for each member of the plurality of lasers in accordance with a corresponding value of the inverse function (column 4, lines 16-56).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 5, 11-12, 14, 18-20, 25-27, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chraplyvy et al. (U.S. Patent US 5,225,922) in view of J. L. Zyskind et al. (J. L. Zyskind et al., "Chapter 2 Erbium-doped fiber amplifiers for optical communications" in Optical Fiber Telecommunications IIIB, I. P. Kaminow and T. L. Koch, edited, 1997, Academic Press, pages 13-68) and Chen et al. (U.S. Patent US 6,900,932).

Regarding claim 5, Chraplyvy further teaches that the communication network as in claim 1 which includes at least one optical receiver (fig. 2, detector 52) wherein the receiver inherently exhibits an input range. The system of Chraplyvy differs from the claimed invention in that Chraplyvy does not specifically teach that the signals coupled to the receiver, in accordance with transmitter parameter output values, fall within the input range. However, examiner takes the Official Notice that it would have been obvious for one of ordinary skill in the art at the time when the invention was made to keep the input power couple into an optical receiver within the receiving range of the receiver in order to have the receiver function properly.

Regarding claims 11, 14, the process of Chraplyvy differs from the claimed invention in that Chraplyvy does not explicitly disclose to raise value of the inverse gain function to a predetermined power. However, Zyskind discloses that the total gain of 13 amplifiers is the product of the individual gain of each of the 13 amplifiers (fig. 2.8), and Chen discloses that the basic idea behind these devices is to fabricate an optical filter whose transmission function (loss spectrum) versus wavelength is proportional to the inverse of the gain spectrum of the optical amplifier (Column 2, lines 24-30). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to raise value of the inverse gain function to a predetermined power since scientists and engineers have long known how to raise functions to a power in order to obtain the information to compensate the gain ripple.

Regarding claim 12, the process of Chraplyvy differs from the claimed invention in that Chraplyvy does not specifically teach to raise values of the inverse function to a

power selected from a class which includes the values 2-10. However, it is a common knowledge in the art that the accumulated gain is proportional to the product of the effective span-gains in the system. However, Zyskind discloses that the total gain of 13 amplifiers is the product of the individual gain of each of the 13 amplifiers (fig. 2.8), and Chen discloses that the basic idea behind these devices is to fabricate an optical filter whose transmission function (loss spectrum) versus wavelength is proportional to the inverse of the gain spectrum of the optical amplifier (Column 2, lines 24-30). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to raise values of the inverse function to a power related to the number of spans in the system, includes the values 2-10, in order to obtain the accumulated values of gain ripple of the system.

Regarding claim 18, Chraplyvy further teaches to include dynamically altering laser power settings in accordance with changing network parameters (column 4, lines 16-56; and claim 6).

Regarding claims 19 and 27, the process of Chraplyvy differs from the claimed invention in that Chraplyvy does not specifically teach to provide pre-set laser modules for installation in a network where the number of optical spans (S) between a module and a respective receiver is not larger than a predetermined exponent. However, Zyskind discloses that the total gain of 13 amplifiers is the product of the individual gain of each of the 13 amplifiers (fig. 2.8), and Chen discloses that the basic idea behind these devices is to fabricate an optical filter whose transmission function (loss spectrum) versus wavelength is proportional to the inverse of the gain spectrum of the

optical amplifier (Column 2, lines 24-30). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide pre-set laser modules for installation in a network where the number of optical spans between a module and a respective receiver is not larger than the exponent.

Regarding claim 20, the process of Chraplyvy differs from the claimed invention in that Chraplyvy does not specifically teach that the laser modules each have substantially the same power output profile. However, it would have been an obvious matter of design choice to have the laser modules each having substantially the same power output profile, since applicant has not disclosed that having the laser modules each having substantially the same power output profile solves any stated problem or is for any particular purpose to have the laser modules each having substantially the same power output profile.

Regarding claim 25, Chraplyvy teaches an optical network (fig. 2) comprising: a plurality of optical links (span 20); a plurality of amplifiers (amplifier 22) coupled to respective links wherein at least some of the amplifiers exhibit common gain profiles (column 3, lines 66-67 and column 4, lines 1-3); a plurality of optical transmitters (combination of P1-Pn and optical power adjuster 54) coupled to an input of a selected link; and pre-emphasis adjustment circuitry (which drives the power adjuster portion of the transmitter; column 4, lines 16-56) coupled to the members of the plurality of transmitters. The system of Chraplyvy differs from the claimed invention in that Chraplyvy does not specifically teach that each transmitter's output power is set in accordance with an inverse of the gain profile raised to a predetermined exponent.

However, Zyskind discloses that the total gain of 13 amplifiers is the product of the individual gain of each of the 13 amplifiers (fig. 2.8), and Chen discloses that the basic idea behind these devices is to fabricate an optical filter whose transmission function (loss spectrum) versus wavelength is proportional to the inverse of the gain spectrum of the optical amplifier (Column 2, lines 24-30). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to raise value of the inverse gain function to a predetermined power and set each transmitter's output power in accordance with an inverse of the gain profile raised to a predetermined exponent in order to compensation the accumulated gain ripple of the system.

Regarding claim 26, Chraplyvy further teaches that the pre-emphasis circuitry sets each transmitter's output power in accordance with the inverse gain profile (column 4, lines 16-56; column 7, lines 8-60).

Regarding claim 29, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to select a receiver having a proper sensitivity range, including on the order of 2S dB, for a particular network to meet the particular requirement for the network.

5. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gilliland et al. (U.S. Patent US 6,108,114).

Regarding claim 30, Gilliland teaches an optical transmitter (fig. 2), comprising an optical emitter and circuitry coupled to the emitter for generating controlled signal (column 5, lines 51-55), the circuitry can adjust an output of the emitters in accordance

with a control signal, including an inverse of a composite amplifier gain profile. The system of Gilliland differs from the claimed invention in that Gilliland does not specifically teach a transmitter nodule comprising a plurality of optical emitters. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to build a transmitter nodule comprising a plurality of optical emitters and circuitry coupled to the transmitters for adjusting an output parameter of the transmitter using the optical transmitter taught by Gilliland, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co., 193 USPQ 8.*

6. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chraplyvy et al. (U.S. Patent US 5,225,922) in view of Goodwin et al (U.S. Patent US 6,701,089 B1).

Regarding claim 31, Chraplyvy teaches a pre-emphasis method comprising: establishing a gain profile across a range of wavelength for at least one mutli-channel light path (fig. 3); setting transmitter output power in accordance with the gain profile. Chraplyvy differs from the claimed invention in that Chraplyvy does not specifically disclose establishing the widest acceptable receiver input power variation and determining a maximum number of allowable cascaded light paths in response thereto. However, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to establish the widest acceptable receiver input power variation and determine a maximum number of allowable cascaded light paths in

response thereto in order to meet the bit-error-rate requirement for a particular network system. Chraplyvy further differs from the claimed invention in that Chraplyvy does not specifically disclose forming an inverse of the gain profile. However, it is well known in the art to form an inverse profile from a gain profile. For example Goodwin teaches to from an inverse of a gain profile (fig.2). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to form an inverse profile from a gain profile, as it is taught by Goodwin, in order to design compensation for the gain ripple. Chraplyvy and Goodwin further differs from the claimed invention in that Chraplyvy and Goodwin do not specifically teach to raise the inverse of the gain profile to an exponent which corresponds to the maximum allowable number of light paths to form a processed inverse profile. However, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to raise the inverse of the gain profile to an exponent which corresponds to the maximum allowable number of light paths to form a processed inverse profile is an obvious process since scientist and engineers have long known how to raise functions to exponents and it is a common knowledge in the art that the accumulated gain ripple directly relates to the number of spans in the system.

7. Claim 32-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sundelin (U.S. Patent US 6,091,869) in view of Wilner et al. (U.S. Patent US 6,341,021B1).

Regarding claim 32, Sundelin discloses an optical system comprising: a plurality of communications links (fig. 1, cable); a plurality of add/drop elements (fig. 1, add/drop nodes) between various members of the plurality of links, each of the elements (fig. 3) including a pre-amplifier (fig. 3, pre-amp 19), the pre-amplifier inherently having a common predetermined input range. The system of Sundelin differs from the claimed invention in that Sundelin does not specifically teach that at least one pre-set pre-emphasis module located at one of the elements, the module coupling a plurality of gain adjusted optical signals to an input of one of the links associated with the one element, the module being usable to limit incoming optical signals to the predetermined input range when used with up to a predetermined number of optical links determined by the common input range. However, Sundelin further teaches that the power per channel in the added signal is given approximately the same level as the power of each passing channel by an optical amplifier arranged in the input line to the add coupler from the multiplexer (abstract), and it is well known in the art to use a pre-set pre-emphasis module to control and limit the input signals. For example, Wilner teaches a dynamic pre-emphasis module (dynamic power equalization module) (fig. 1, module 10), used in a WDM system with non-uniform amplifiers, which couples a plurality of gain adjusted optical signals to the system; and it is well known in the art that a dynamic pre-emphasis module can be used as a static pre-emphasis module and pre-set the emphasis values. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate the pre-emphasis module taught by Wilner into the system of Sundelin, and pre-set the emphasis module to limit incoming optical

signals to the predetermined input range when used with up to a predetermined number of optical links determined by the common input range in order to overcome gain non-uniformity and equalize WDM channels to ensure robust network operation.

Regarding claim 33, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to include a plurality of substantially identical pre-emphasis module in the system in order to reduce the cost for spare parts.

Regarding claim 34, Sundelin further teaches that the elements includes at least one output amplifier (fig. 3, amplifier 43 and 45) with the pre-amplifier (fig. 3, amplifiers 19 and 21) having a first common gain profile and the output amplifiers having a second common gain profile (column 3, lines 43-67).

Regarding claims 35, 36, and 37, the modified system of Sundelin and Wilner differs from the claimed invention in that Sundelin and Wilner do not specifically teach that the pre-emphasis modules each incorporate channel based gain characteristics in accordance with an inverse of at least the common gain profile or the inverse of both of the common gain profile or the gain profiles raised to the predetermined number of links. However, Wilner further teaches that the pre-emphasis module is used to equalize the channels in the system, including gain non-uniformity. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to configure the pre-emphasis modules incorporate channel based gain characteristics in accordance with an inverse of at least the common gain profile the inverse of both of the common gain profile or the gain profiles raised to the predetermined number of links in order to compensate the gain non-uniformity.

Response to Arguments

8. Applicant's arguments on objections under U.S.C.112 filed 4/14/2005 have been fully considered but they are not persuasive.

Applicant argues on the rejection of claim 1 because "the instant application does not teach what it means by the 'output parameter values'." and claims that "one of skill in the art would understand how to make and use the invention of claim 1 from the present application and figures". The Examiner disagrees on the applicant's claim. The first time the phrase "output parameter values" appears in the instant application is in claim 1. Prior to claim 1, the phrase "output parameter values" is not introduced, presented, or described. Therefore, it is not clear what is means by "output parameter values" and certainly it is impossible for one of skill in the art to understand how to make and use the invention of claims 1-5.

Regarding claim 6, the phrases "channel based radiant energy beams" and "a selected parameter" are not introduced, presented, or described in the instant application prior to claim 6. Therefore, it is not clear what is means by "channel based radiant energy beams" and "a selected parameter, and it is impossible for one of skill in the art to understand how to make and use the invention of claims 6-10.

Claim 10 recites "setting an output parameter" in line 5. But the phrase "output parameter" was not described in the instant application, and the instant application does not teach what it means by the "output parameter", consequently it does not teach how

to set the "output parameter". Therefore, the disclosure fails to enable a person skilled in the art to make and use the claimed invention as recited in claims 10-20.

Claim 30 recites "adjusting an output parameter profile" in lines 8-9. But the instant application does not teach what is the "output parameter profile" and how to adjust the "output parameter profile". Therefore, the disclosure fails to enable a person skilled in the art to make and use the claimed invention as recited in claims 30.

35 U.S.C. 113 requires that "the applicant shall furnish a drawing where necessary for the understanding of the subject matter sought to be patented." Therefore, the drawings should be helpful in understanding of the subject matter sought to be patented. To achieve this goal proper labels are necessary for drawings. "AMOUNT AWAY FROM TARGET" itself is not descriptive and should not be used as label in a figure. The label for vertical axis in fig. 5 should be more specific and indicative in order not to be confusing.

9. Applicant's other arguments with respect to claims 1-20, and 25-27 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Olshansky (U.S. Patent US 5,276,543) discloses an optical signal equalizer for WDM system

Taga et al. (U.S. Patent US 5,790,289) disclose a WDM system with pre-emphasis techniques.

Shimokawa et al. (U.S. Patent US 6,445,471 B1) disclose an apparatus and method for making transmission characteristics uniform in a WDM system.

DaSilva et al. (U.S. Patent US 6,674,557 B1) disclose a WDM system utilizing pre-emphasis to equalize the received OSNR.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quan-Zhen Wang whose telephone number is (571) 272-3114. The examiner can normally be reached on 9:00 AM - 5:00 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

M. R. SEDIGHIAN
PRIMARY EXAMINER